CLAIMS

We claim:

1. An isolated preparation of a regulatory poly(A) polymerase (PAP), wherein the polymerase comprises both a catalytic subunit and an RNA-binding subunit.

2. An isolated polynucleotide encoding the polymerase of claim 1.

3. The preparation of claim 1 wherein the polymerase comprises GLD-2 and GLD-3 proteins.

4. An isolated polynucleotide encoding the polymerase of claim 3.

5. The preparation of claim 1 wherein the catalytic subunit is GLD-2.

6. The preparation of claim 1 wherein the catalytic subunit is a mutant of GLD-2 that retains catalytic activity.

7. The polymerase of claim 1 wherein the catalytic subunit is hRPAP1 or a mutant of hRPAP that retains catalytic activity.

8. An isolated polynucleotide encoding the polymerase of claim 7.

9. The preparation of claim 1 wherein the RNA-binding subunit is selected from the group consisting of GLD-3, GIP-1 and GIP-2.

10. An isolated polynucleotide encoding the polymerase of claim 9.

11. The polymerase of claim 1 wherein the catalytic subunit is obtained from the mRPAP gene or a mutant of mRPAP that retains catalytic activity.

12. An isolated preparation of the catalytic subunit of an rPAP.

13. The preparation of claim 12 wherein the catalytic subunit is GLD-2 or a mutant of GLD-2 that retains catalytic activity.

14. The preparation of claim 12 wherein the subunit is hRPAP or a mutant that retains catalytic activity.

15. The preparation of claim 12 wherein the catalytic subunit is mRPAP or a mutant that retains catalytic activity.

16. A method of identifying molecules that either increase or decrease the activity of an rPAP, comprising the steps of exposing a candidate molecule to an rPAP and determining whether the candidate molecule increases or decreases polymerase activity.

17. The method of claim 16 wherein the rPAP comprises GLD-2 or a mutant retaining catalytic activity.

18. The method of claim 16 wherein the polymerase is hRPAP or a mutant retaining catalytic activity.

19. The method of claim 18 wherein the catalytic subunit comprises mRPAP or a mutant retaining catalytic activity.

20. The method of claim 16 wherein the catalytic portion of the polymerase is selected from the group consisting of peptides encoded by yeast TRF-5, hRPAP1, and mRPAP.

21. A method of identifying molecules that increase or decrease the activity of the catalytic subunit of an rPAP comprising the step of exposing a candidate molecule to the catalytic subunit of an rPAP and determining whether the candidate molecule increases or decreases polymerase activity.

22. The preparation of claim 21 wherein the subunit comprises GLD-2 or a mutant retaining catalytic activity.

23. The preparation of claim 21 wherein the subunit comprises RPAP or a mutant retaining catalytic activity.

24. The preparation of claim 1 wherein the catalytic subunit comprises mRPAP or a mutant of mRPAP that retains catalytic activity.

25. The polymerase of claim 1 wherein the catalytic subunit is obtained by expression of a gene isolated from *H. sapiens*.

26. The method of claim 16 wherein the catalytic portion of the polymerase is selected from the group consisting of peptides encoded by yeast TRF-5, hRPAP1, and mRPAP.

27. A method of identifying molecules that are catalytic subunits of rPAPs, comprising the step of comparing the nucleotide or amino acid sequence of the candidate molecule with the GLD-2 sequence and subjecting the corresponding protein to a functional analysis, wherein the candidate protein is a suitable catalytic subunit of an rPAP if the sequence of the protein is related to the GLD-2 sequence and the functional analysis reveals that the protein has poly(A) polymerase activity.

28. A method of adding adenosine residues to an mRNA comprising the step of combining adenosine residues, an mRNA molecule and the polymerase of claim 1, wherein multiple adenosine residues are added to the mRNA.